

## Claims

- [c1] A barbed suture for connecting human or animal tissue, said suture comprising
  - (a) an elongated body having a first end and a second end and a diameter and
  - (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have a configuration comprising a barb cut angle  $\Theta$  ranging from about 140 degrees to about 175 degrees.
- [c2] The barbed suture according to claim 1, wherein the barb cut angle  $\Theta$  ranges from about 145 degrees to about 173 degrees.
- [c3] The barbed suture according to claim 2, wherein the barb cut angle  $\Theta$  ranges from about 150 degrees to about 170 degrees.
- [c4] The barbed suture according to claim 1, wherein the barbs are configured in at least two sets, each set having a barb size different from the barb size of the other set.
- [c5] The barbed suture according to claim 1, wherein the suture is made from a material selected from the group consisting of a bio-absorbable material, a non-absorbable material, and combinations thereof.
- [c6] The barbed suture according to claim 5, wherein the bio-absorbable material is selected from the group consisting of polydioxanone, polylactide, polyglycolide, polycaprolactone, and combinations thereof.
- [c7] The barbed suture according to claim 5, wherein the non-absorbable material is selected from the group consisting of a polymer, a metal, a metal alloy, a natural fiber, and combinations thereof.
- [c8] The barbed suture according to claim 7, wherein the polymer is selected from the group consisting of polyamide, polyester, polypropylene, polyurethane, polytetrafluoroethylene, polyether-ester, and combinations thereof.
- [c9] The barbed suture according to claim 1, wherein the barbs have a disposition

on the body selected from the group consisting of a staggered disposition, a twist cut multiple spiral disposition, an overlapping disposition, a random disposition, and combinations thereof.

[c10] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end and a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have a configuration comprising a barb cut depth with a ratio of the barb cut depth to the suture diameter ranging from about 0.05 to about 0.6.

[c11] The barbed suture according to claim 10, wherein the ratio of the barb cut depth to the suture diameter ranges from about 0.1 to about 0.55.

[c12] The barbed suture according to claim 11, wherein the ratio of the barb cut depth to the suture diameter ranges from about 0.2 to about 0.5.

[c13] The barbed suture according to claim 10, wherein the barbs are configured in at least two sets, each set having a barb size different from the barb size of the other set.

[c14] The barbed suture according to claim 10, wherein the suture is made from a material selected from the group consisting of a bio-absorbable material, a non-absorbable material, and combinations thereof.

[c15] The barbed suture according to claim 14, wherein the bio-absorbable material is selected from the group consisting of polydioxanone, polylactide, polyglycolide, polycaprolactone, and combinations thereof.

[c16] The barbed suture according to claim 14, wherein the non-absorbable material is selected from the group consisting of a polymer, a metal, a metal alloy, a natural fiber, and combinations thereof.

[c17] The barbed suture according to claim 16, wherein the polymer is selected from the group consisting of polyamide, polyester, polypropylene, polyurethane, polytetrafluoroethylene, polyether-ester, and combinations thereof.

- [c18]        The barbed suture according to claim 10, wherein the barbs have a disposition on the body selected from the group consisting of a staggered disposition, a twist cut multiple spiral disposition, an overlapping disposition, a random disposition, and combinations thereof.
  
- [c19]        A barbed suture for connecting human or animal tissue, said suture comprising
  - (a) an elongated body having a first end and a second end and a diameter and
  - (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have a configuration comprising a barb cut length with a ratio of the barb cut length to the suture diameter ranging from about 0.2 to about 2.
  
- [c20]        The barbed suture according to claim 19, wherein the ratio of the barb cut length to the suture diameter ranges from about 0.4 to about 1.7.
  
- [c21]        The barbed suture according to claim 20, wherein the ratio of the barb cut length to the suture diameter ranges from about 0.8 to about 1.5.
  
- [c22]        The barbed suture according to claim 19, wherein the barbs are configured in at least two sets, each set having a barb size different from the barb size of the other set.
  
- [c23]        The barbed suture according to claim 19, wherein the suture is made from a material selected from the group consisting of a bio-absorbable material, a non-absorbable material, and combinations thereof.
  
- [c24]        The barbed suture according to claim 23, wherein the bio-absorbable material is selected from the group consisting of polydioxanone, polylactide, polyglycolide, polycaprolactone, and combinations thereof.
  
- [c25]        The barbed suture according to claim 23, wherein the non-absorbable material is selected from the group consisting of a polymer, a metal, a metal alloy, a natural fiber, and combinations thereof.
  
- [c26]        The barbed suture according to claim 25, wherein the polymer is selected from the group consisting of polyamide, polyester, polypropylene, polyurethane,

polytetrafluoroethylene, polyether-ester, and combinations thereof.

[c27] The barbed suture according to claim 19, wherein the barbs have a disposition on the body selected from the group consisting of a staggered disposition, a twist cut multiple spiral disposition, an overlapping disposition, a random disposition, and combinations thereof.

[c28] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end and a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have a configuration comprising a barb cut distance with a ratio of the barb cut distance to the suture diameter ranging from about 0.1 to about 6.

[c29] The barbed suture according to claim 28, wherein the ratio of the barb cut distance to the suture diameter ranges from about 0.5 to about 4.5.

[c30] The barbed suture according to claim 29, wherein the ratio of the barb cut distance to the suture diameter ranges from about 1.0 to about 3.5.

[c31] The barbed suture according to claim 28, wherein the barbs are configured in at least two sets, each set having a barb size different from the barb size of the other set.

[c32] The barbed suture according to claim 28, wherein the suture is made from a material selected from the group consisting of a bio-absorbable material, a non-absorbable material, and combinations thereof.

[c33] The barbed suture according to claim 32, wherein the bio-absorbable material is selected from the group consisting of polydioxanone, polylactide, polyglycolide, polycaprolactone, and combinations thereof.

[c34] The barbed suture according to claim 32, wherein the non-absorbable material is selected from the group consisting of a polymer, a metal, a metal alloy, a natural fiber, and combinations thereof.

- [c35] The barbed suture according to claim 34, wherein the polymer is selected from the group consisting of polyamide, polyester, polypropylene, polyurethane, polytetrafluoroethylene, polyether-ester, and combinations thereof.
- [c36] The barbed suture according to claim 28, wherein the barbs have a disposition on the body selected from the group consisting of a staggered disposition, a twist cut multiple spiral disposition, an overlapping disposition, a random disposition, and combinations thereof.
- [c37] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end and a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have a configuration comprising a corrugated barb underside.
- [c38] The barbed suture according to claim 37, wherein the barbs are configured in at least two sets, each set having a barb size different from the barb size of the other set.
- [c39] The barbed suture according to claim 37, wherein the suture is made from a material selected from the group consisting of a bio-absorbable material, a non-absorbable material, and combinations thereof.
- [c40] The barbed suture according to claim 39, wherein the bio-absorbable material is selected from the group consisting of polydioxanone, polylactide, polyglycolide, polycaprolactone, and combinations thereof.
- [c41] The barbed suture according to claim 39, wherein the non-absorbable material is selected from the group consisting of a polymer, a metal, a metal alloy, a natural fiber, and combinations thereof.
- [c42] The barbed suture according to claim 41, wherein the polymer is selected from the group consisting of polyamide, polyester, polypropylene, polyurethane, polytetrafluoroethylene, polyether-ester, and combinations thereof.
- [c43] The barbed suture according to claim 37, wherein the barbs have a disposition

on the body selected from the group consisting of a staggered disposition, a twist cut multiple spiral disposition, a random disposition, and combinations thereof.

[c44] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end, a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have a configuration comprising an arcuate barb base.

[c45] The barbed suture according to claim 44, wherein the barbs are configured in at least two sets, each set having a barb size different from the barb size of the other set.

[c46] The barbed suture according to claim 44, wherein the suture is made from a material selected from the group consisting of a bio-absorbable material, a non-absorbable material, and combinations thereof.

[c47] The barbed suture according to claim 46, wherein the bio-absorbable material is selected from the group consisting of polydioxanone, polylactide, polyglycolide, polycaprolactone, and combinations thereof.

[c48] The barbed suture according to claim 46, wherein the non-absorbable material is selected from the group consisting of a polymer, a metal, a metal alloy, a natural fiber, and combinations thereof.

[c49] The barbed suture according to claim 48, wherein the polymer is selected from the group consisting of polyamide, polyester, polypropylene, polyurethane, polytetrafluoroethylene, polyether-ester, and combinations thereof.

[c50] The barbed suture according to claim 44, wherein the barbs have a disposition on the body selected from the group consisting of a staggered disposition, a twist cut multiple spiral disposition, an overlapping disposition, a random disposition, and combinations thereof.

[c51] A barbed suture for connecting human or animal tissue, said suture comprising

(a) an elongated body having a first end, a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have a configuration comprising varying barb sizes.

[c52] The barbed suture according to claim 51, wherein the barbs are configured in at least two sets, each set having a barb size different from the barb size of the other set.

[c53] The barbed suture according to claim 51, wherein the suture is made from a material selected from the group consisting of a bio-absorbable material, a non-absorbable material, and combinations thereof.

[c54] The barbed suture according to claim 53, wherein the bio-absorbable material is selected from the group consisting of polydioxanone, polylactide, polyglycolide, polycaprolactone, and combinations thereof.

[c55] The barbed suture according to claim 53, wherein the non-absorbable material is selected from the group consisting of a polymer, a metal, a metal alloy, a natural fiber, and combinations thereof.

[c56] The barbed suture according to claim 55, wherein the polymer is selected from the group consisting of polyamide, polyester, polypropylene, polyurethane, polytetrafluoroethylene, polyether-ester, and combinations thereof.

[c57] The barbed suture according to claim 51, wherein the barbs have a disposition on the body selected from the group consisting of a staggered disposition, a twist cut multiple spiral disposition, an overlapping disposition, a random disposition, and combinations thereof.

[c58] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end, a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs

have (i) a barb cut  $\Theta$  angle ranging from about  $140^\circ$  to about  $175^\circ$ , (ii) a barb cut depth where the ratio of the barb cut depth to the suture diameter ranges from about 0.05 to about 0.6, (iii) a barb cut length where the ratio of the barb cut length to the suture diameter ranges from about 0.2 to about 2, and (iv) a barb cut distance where the ratio of the barb cut distance to the suture diameter ranges from about 0.1 to about 6.

[c59] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end, a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have (i) a barb cut  $\Theta$  angle ranging from about  $140^\circ$  to about  $175^\circ$ , (ii) a barb cut depth where the ratio of the barb cut depth to the suture diameter ranges from about 0.05 to about 0.6, (iii) a barb cut length where the ratio of the barb cut length to the suture diameter ranges from about 0.2 to about 2, (iv) a barb cut distance where the ratio of the barb cut distance to the suture diameter ranges from about 0.1 to about 6, and (v) a staggered disposition.

[c60] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end, a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have (i) a barb cut  $\Theta$  angle ranging from about  $140^\circ$  to about  $175^\circ$ , (ii) a barb cut depth where the ratio of the barb cut depth to the suture diameter ranges from about 0.05 to about 0.6, (iii) a barb cut length where the ratio of the barb cut length to the suture diameter ranges from about 0.2 to about 2, (iv) a barb cut distance where the ratio of the barb cut distance to the suture diameter ranges from about 0.1 to about 6, and (v) a twist cut multiple spiral disposition with a spirality angle  $\alpha$  ranging from about  $5^\circ$  to about  $25^\circ$ .

[c61] A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end, a second end and a diameter and (b) a



plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have (i) a barb cut  $\Theta$  angle ranging from about 140 ° to about 175 °, (ii) a barb cut depth where the ratio of the barb cut depth to the suture diameter ranges from about 0.05 to about 0.6, (iii) a barb cut length where the ratio of the barb cut length to the suture diameter ranges from about 0.2 to about 2, (iv) a barb cut distance where the ratio of the barb cut distance to the suture diameter ranges from about 0.1 to about 6, and (v) an overlapping disposition.

[c62]

A barbed suture for connecting human or animal tissue, said suture comprising (a) an elongated body having a first end, a second end and a diameter and (b) a plurality of barbs projecting from the body, each barb facing in a direction and being adapted for resisting movement of the suture, when in tissue, in an opposite direction from the direction in which the barb faces, wherein the barbs have (i) a barb cut  $\Theta$  angle ranging from about 140 ° to about 175 °, (ii) a barb cut depth where the ratio of the barb cut depth to the suture diameter ranges from about 0.05 to about 0.6, (iii) a barb cut length where the ratio of the barb cut length to the suture diameter ranges from about 0.2 to about 2, (iv) a barb cut distance where the ratio of the barb cut distance to the suture diameter ranges from about 0.1 to about 6, and (v) a random disposition.